

Irie teaches an apparatus and method for manufacturing a radial tire. A carcass ply is formed into a cylindrical shape having an external diameter almost equal to an internal diameter of a pair of beaded cores. The cylindrical carcass is subsequently transformed to assume a circumferentially wave-shaped corrugated carcass ply over an entire length thereof in an axial direction while containing an outer diameter of the carcass ply. The pair of beaded cores is arranged in selected positions on the wave-shaped corrugated carcass ply which has been contracted in diameter. The carcass ply is then normalized into its cylindrical shape so as to form a structure having a pair of bead cores in contact with the external surface of the carcass ply. The carcass ply is expanded in diameter in an area thereof between the pair of bead cores of the structure. End portions of the carcass ply disposed axially outside the bead cores are bent so as to enclose the bead cores therein within portions of the carcass ply. A cylindrical carcass layer is then assembled by incorporating sidewall members with the structure. The cylindrical carcass layer is transformed to a torroidal shape thereby forming a green tire.

Aihara teaches a method and apparatus for supplying tire component material.

Brown teaches a method for making a multi-component tire. A band that constitutes a tire carcass is formed by adding gum strips to an inner liner which is covered with a ply to form the band which is then transferred to a first tire building position for the addition of a sidewall, shoulder wedge and beads. From this position, these components are transferred to a second tire building position for final shaping of an uncured tire and the addition of breakers and tread rubber. The sidewall and shoulder wedge are formed by applying a plurality of turns of elastomer strip to obtain their shape on the carcass at the first tire building position.

Laurent teaches a method and apparatus of manufacturing a tire by laying rubber products onto a firm support.

Okada teaches an apparatus and method for aligning and splicing strip members for the manufacturer of pneumatic radial tires.

Caretta teaches a method and system for producing a plurality of different tires. The method is directed to production on the same line of production of a plurality of

tires having various features and distributed in at least two separate series. Each series has identical tires with one series differing from the other series by at least one different structural or dimensional feature of the series of tires.

Claim 1 is directed to a tire forming system that includes a band forming machine, a shaping forming machine and a belt/tread forming machine, in each of which setting conditions of a tire size can be optionally changed, and having transport means for delivering a semi-fabricated product to each forming machine. Claim 1 recites that as means for supplying a band member there are provided:

(1) inner liner supply means for cutting a inner liner sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of a formed tire, and supplying the cut inner liner to the band forming machine;

(2) carcass supply means for cutting a carcass sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of the formed tire, and supplying the cut carcass to the band forming machine;

(3) band rubber parts supply means for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the band forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire; and

(4) bead supply means for supplying a completed bead corresponding to a specification of the formed tire to the band forming machine through a bead setter.

Claim 1 further recites that as means for supplying a belt/tread member there are provided:

(5) belt supply means for cutting a belt strip material, in which plural cords are arranged and rubberized, to predetermined length and angle, mutually splicing edge portions of the plural cut strip pieces to form a belt for one tire, which has a length, a cord angle and a width corresponding to specifications of the formed tire, and supplying the belt to the belt/tread forming machine; and

(6) tread rubber parts supply means for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the belt/tread forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire.

Additionally, claim 1 recites that the means for supplying the band member and the means for supplying the belt/tread member are operative to cooperate with one another to continuously in series form a plurality of tires having different tire sizes yet a same bead inner diameter. Furthermore, claim 1 recites that the bead supply means holds plural kinds of completed beads each having a bead core corresponding to the band periphery length, selects the completed bead corresponding to the specification of the formed tire from the plural kinds of completed beads, and supplies the selected completed bead to the band forming machine through the bead setter.

Claim 5 is directed to a tire forming method using a tire forming system that includes a band forming machine, a shaping forming machine and a belt/tread forming machine, in each of which setting conditions of a tire size can be optionally changed, and having transport means for delivering a semi-fabricated product to each forming machine. Claim 5 recites that as a process for supplying a band member there are provided:

(1) an inner liner supply process for cutting a inner liner sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of a formed tire, and supplying the cut inner liner to the band forming machine;

(2) a carcass supply process for cutting a carcass sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of the formed tire, and supplying the cut carcass to the band forming machine;

(3) a band rubber parts supply process for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the band forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire; and

(4) a bead supply process for supplying a completed bead corresponding to a specification of the formed tire to the band forming machine through a bead setter.

Claim 5 also recites that as a process for supplying a belt/tread member there are provided:

(5) a belt supply process for cutting a belt strip material, in which plural cords are arranged and rubberized, to predetermined length and angle, mutually splicing edge portions of the plural cut strip pieces to form a belt for one tire, which has a length, a cord angle and a width corresponding to specifications of the formed tire, and supplying the belt to the belt/tread forming machine; and

(6) a tread rubber parts supply process for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the belt/tread forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire.

Also, claim 5 recites that the forming system is operative to continuously in series form a plurality of tires having different tire sizes yet a same bead inner diameter.

Furthermore, claim 5 recites that, in the bead supply process, plural kinds of completed beads each having a bead core corresponding to the band periphery length are prepared, the completed bead corresponding to the specification of the formed tire is selected from the plural kinds of completed beads, and the selected completed bead is supplied to the band forming machine through the bead setter.

It is respectfully submitted that none of the applied art, alone or in combination, teaches or suggests the features of claims 1 and 5. Specifically, the applied art fails to teach or suggest that the bead supply means holds plural kinds of completed beads each having a bead core corresponding to the band periphery length, selects the completed bead corresponding to the specification of the formed tire from the plural kinds of completed beads, and supplies the selected completed bead to the band forming machine through the bead setter as recited in claim 1. Similarly, the applied art fails to teach or suggest that, in the bead supply process, plural kinds of completed beads each having a bead core corresponding to the band periphery length are

prepared, the completed bead corresponding to the specification of the formed tire is selected from the plural kinds of completed beads, and the selected completed bead is supplied to the band forming machine through the bead setter as recited in claim 5. Thus, it is respectfully submitted that one of ordinary skill in the art would not be motivated to combine the features of the applied art because such combination would not result in the claimed invention. Therefore, it is respectfully submitted that claims 1 and 5 are allowable over the applied art

Claims 3 and 4 depend from claim 1 and include all of the features of claim 1. Claims 7 and 8 depend from claim 5 and include all of the features of claim 5. Thus, it is respectfully submitted that the dependent claims are allowable at least for the reasons the independent claims are allowable as well as for the features they recite.

In the final Office Action, claims 2 and 6 are rejected under 35 U.S.C. 103(a) as unpatentable over Irie in view of Aihara, Brown, Laurent, Okada and optionally to Caretta has applied claims 1, 3-5, 7 and 8 and further in view of Krupp (EP 624,456).

Krupp teaches transporting and centering equipment for tire beat wires.

As discussed above, claims 1, 3-5, 7 and 8 are allowable over Irie in view of Aihara, Brown, Laurent, Okada and optionally to Caretta. Thus, claims 1, 3-5, 7 and 8 are allowable over these references.

Claim 2 is now canceled but its features are now incorporated into claim 1. Claim 6 is now canceled but its features are now incorporated into claim 5.

Applicants respectfully reiterates, that, Krupp, in contrast to the claimed invention, relates to an apparatus for conveying beads having different inner diameters. It is respectfully submitted that Krupp has nothing to do with the claimed invention. As recited in lines 17-24 on page 15 of the specification, the finished beads or bead products in or for the claimed invention have a constant bead core size but have bead fillers of different kinds. For at least these reasons, it is respectfully submitted that claims 1 and 5, as amended, are allowable over the applied art.

Withdrawal of the rejection is respectfully requested.

In view of the foregoing, reconsideration of the application and allowance of the pending claims are respectfully requested. Should the Examiner believe anything


further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

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Enclosure(s): Appendix I (Marked-up Version of Amended Claims)  
Petition for Extension of Time (one month)  
Request for Continued Examination

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## **APPENDIX I**

### **(MARKED-UP VERSION OF AMENDED CLAIMS)**

1. (Thrice Amended) A tire forming system including a band forming machine, a shaping forming machine and a belt/tread forming machine, in each of which setting conditions of a tire size can be optionally changed, and having transport means for delivering a semi-fabricated product to each forming machine, wherein as means for supplying a band member there are provided:

(1) inner liner supply means for cutting a inner liner sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of a formed tire, and supplying the cut inner liner to the band forming machine;

(2) carcass supply means for cutting a carcass sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of the formed tire, and supplying the cut carcass to the band forming machine;

(3) band rubber parts supply means for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the band forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire; and

(4) bead supply means for supplying a completed bead corresponding to a specification of the formed tire to the band forming machine through a bead setter; and

as means for supplying a belt/tread member there are provided:

(5) belt supply means for cutting a belt strip material, in which plural cords are arranged and rubberized, to predetermined length and angle, mutually splicing edge portions of the plural cut strip pieces to form a belt for one tire, which has a length, a cord angle and a width corresponding to specifications of the formed tire, and supplying the belt to the belt/tread forming machine; and

(6) tread rubber parts supply means for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the belt/tread forming machine,

and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire,

wherein the means for supplying the band member and the means for supplying the belt/tread member are operative to cooperate with one another to continuously in series form a plurality of tires having different tire sizes yet a same bead inner diameter and

wherein the bead supply means holds plural kinds of completed beads each having a bead core corresponding to the band periphery length, selects the completed bead corresponding to the specification of the formed tire from the plural kinds of completed beads, and supplies the selected completed bead to the band forming machine through the bead setter.

5. (Thrice Amended) A tire forming method using a tire forming system including a band forming machine, a shaping forming machine and a belt/tread forming machine, in each of which setting conditions of a tire size can be optionally changed, and having transport means for delivering a semi-fabricated product to each forming machine, wherein as a process for supplying a band member there are provided:

(1) an inner liner supply process for cutting a inner liner sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of a formed tire, and supplying the cut inner liner to the band forming machine;

(2) a carcass supply process for cutting a carcass sheet material having a width, in which a splice margin is added to a band periphery length, to a length corresponding to a specification width of the formed tire, and supplying the cut carcass to the band forming machine;

(3) a band rubber parts supply process for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the band forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire; and



(4) a bead supply process for supplying a completed bead corresponding to a specification of the formed tire to the band forming machine through a bead setter; and

as a process for supplying a belt/tread member there are provided:

(5) a belt supply process for cutting a belt strip material, in which plural cords are arranged and rubberized, to predetermined length and angle, mutually splicing edge portions of the plural cut strip pieces to form a belt for one tire, which has a length, a cord angle and a width corresponding to specifications of the formed tire, and supplying the belt to the belt/tread forming machine; and

(6) a tread rubber parts supply process for injecting a rubber strip from an injection unit, winding the rubber strip around a drum of the belt/tread forming machine, and forming, on the basis of its laminated structure, rubber parts having a profile corresponding to a specification of the formed tire,

wherein the forming system is operative to continuously in series form a plurality of tires having different tire sizes yet a same bead inner diameter and

wherein, in the bead supply process, plural kinds of completed beads each having a bead core corresponding to the band periphery length are prepared, the completed bead corresponding to the specification of the formed tire is selected from the plural kinds of completed beads, and the selected completed bead is supplied to the band forming machine through the bead setter.